3010L Power Controller

Manual

Revision 1.0

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This Manual

This manual provides any required information for installation, configuration and operation of the 3010L Power Controller.

It exclusively treats the handling of this device. It neither describes the LonWorks technology by Echelon nor the LonMark profile implemented in detail. More specific information concerning these subjects can be found in the documentation of Echelon (www.echelon.com) and the LonMark Interoperability Association (www.lonmark.org).

The first part of this manual provides a survey about the device and its installation in chapters 1 to 3. The 2nd part describes the implemented application for lighting control and its configuration possibilities. Chapter 4 contains a description of the firmware interface while chapter 5 describes the implemented LonMark Objects in detail providing an outlook of the individual objects, their tasks and their relevant configuration parameters.

Chapter 6 explains the basics required to connect the objects to each other.

This manual is relevant for all variants of the 3010L Power Controller where applications for lighting and switch control are implemented.

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2 Product Information

2.1 Functional Elements

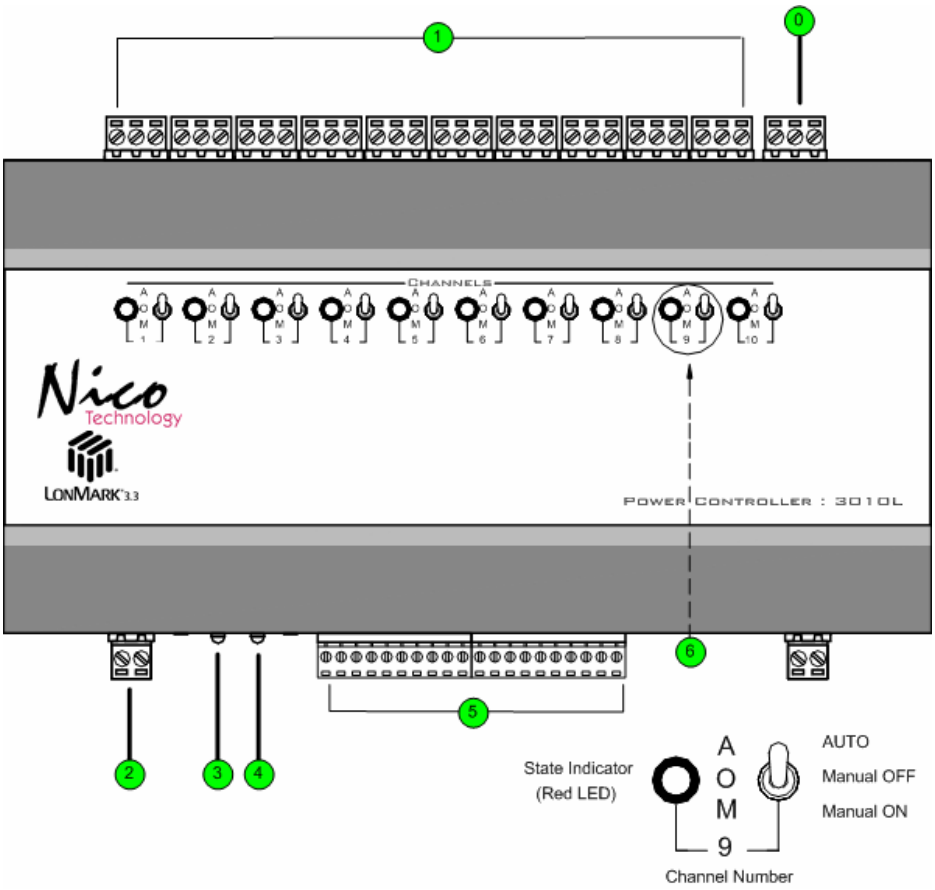


Figure 1.1 3010L Power Controller

No	Description
0	Input AC power supply connection
1	Output channels for relay output
2	Connect to LonWorks network
3	Service Pin button and Service Pin LED indicator
4	Reset button and Reset LED indicator
5	Input channels of dry contact.
6	3 way by-pass switch for Auto/Manual OFF/Manual ON

2.2 Variants and Identifications

2.3 Scope of Delivery

3 Installation

This chapter first describes the installation of the device; the installation of the configuration software is described in section 2.4.

3.1 Warnings

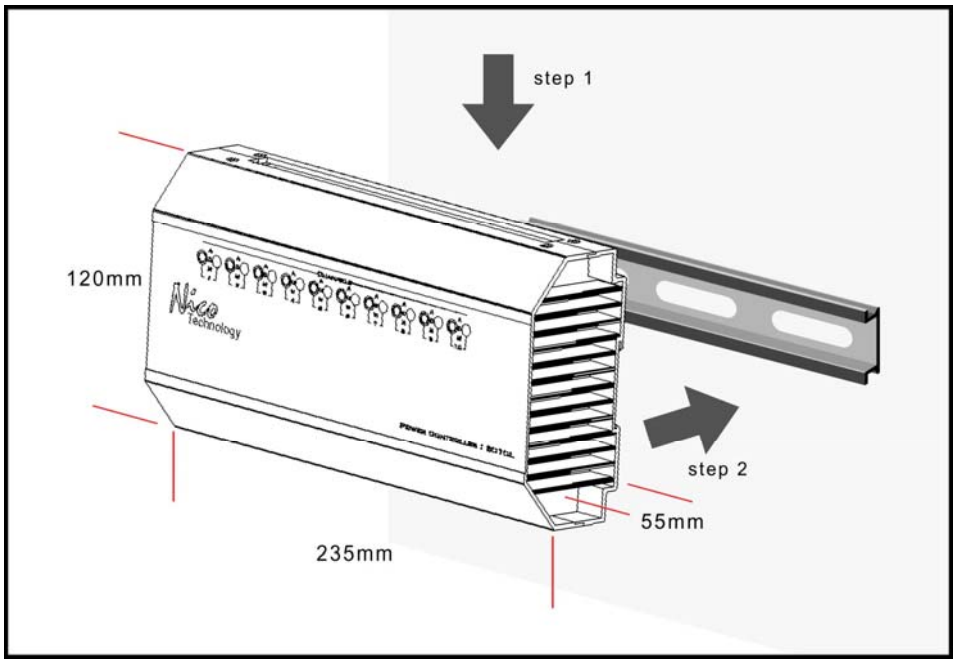
Attention

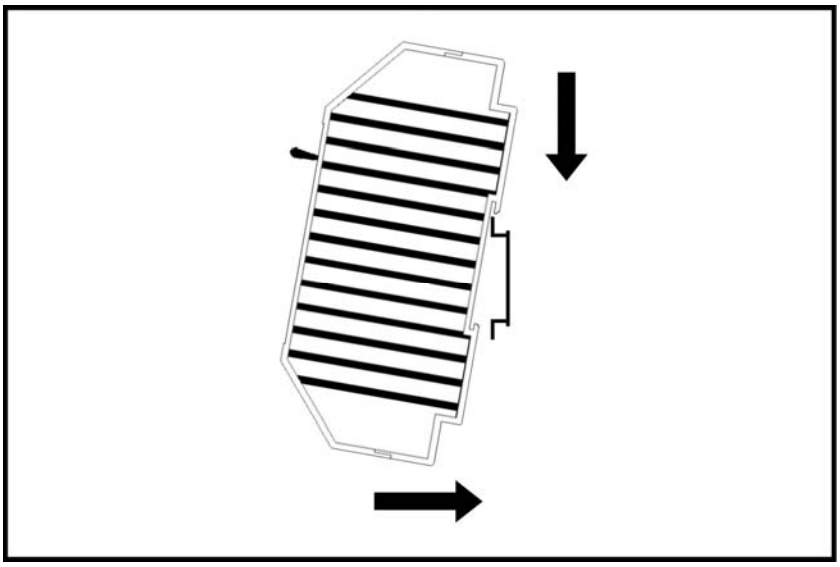
The device must be installed in compliance with the relevant DIN/VDE regulations or the relevant national standards. The connection to the supply voltage must be performed in accordance with VDE 0100 and VDE 0160 or the relevant national standards. Installation should perform by qualified and technical experienced personnel only.

CAUTION

At the connections of the output channels 1 – 4 (Fig. 1.1, terminals 7, 8, 9, A) and the power supply (terminals 1, 2) 110/240V main voltage with load guard band is accessible. The installation of the unit therefore has to be effected in a switch cabinet or behind a respective cover.

3.2 Mounting





3.3 Connections

The 3010L has to be connected to a 110/240VAC power supply and to the LonWorks network. According to the respective application peripheral equipment has to be connected to outputs.

Attention

Before connecting peripheral equipment the power supply device has to be switched off and by-pass switch has to be switch to manual off.

The connection is effected by means of the included plug-screw terminals.

Clamping range of the plug-screw terminals:

- High load connections (5.08mm grid, terminals **0 , 1**): 0.2 – 2.5mm
- Low voltage connections (3.5mm grid, terminals **2 , 5**): 0.14 – 1.5mm

The pin assignment of the connections is described in chapter 3.1, also containing wiring details.

Voltage

The 110/240 Volt connections are through connected in order to achieve easy wiring.

LonWorks Network

The connection to the LonWorks network is made by means of twisted-pair cables. The connection "shield" has to be connected to ground in order to achieve a reliable dissipation of over-voltage on the LON circuits.

Relay Outputs

The actors to be controlled are connected to the relay outputs. In each case the connection is effected between terminal 1)..

Attention

The 3010L input power supply must be same AC power phase.

3.4 Software Installation

The configuration software of the 3010L Power Controller has to be installed by starting the program Setup.exe on the data carrier provided. It suns under Windows 9x/2000 and NT.

Download url: http://www.nico-tech.com/download

4 Device Description

The 3010L is a Power Controller for LonWorks network in building automation. Its peripheral scope has been specially designed for the use as switch controller for device spreading control of applications such as lighting control.

For the use in lighting the 3010L realizes 10 independent output channels with ten relay output to control conventional switch.
For the use in sensor the 3010L realizes 10 independent input channes with ten dry contacts for sensor input.

The LonMark object available per channel flexible use of the 3010L; Furthermore there are several timer functions for the operation by switch function. The configuration of the lighting control application is effected via a plug-In.

Of course, the 3010L is also freeing programmable in Neuron C. As a flash module is used the application can be load via the LonWorks network, making the 3010L an I/O controller, e.g.

4.1 Hardware Survey

The 3010L disposes of ten output circuit for each. The output circuit can be controlled individually relay output 8A@110/240VAC.

4.2 Operation and Display Elements

The 3010L is fitted with a service button accessible via a small gap on the front panel (see Figure. 1.1, **3**). Activation of the buttons generates a service-pin message transmitted via the LonWorks network. The processor status as well as the service-pin status are displayed by the service LED (figure. 1.1.**3**), which is on while the service button is activated. By use the network management function Wink the service LED flashes.

Furthermore the 3010L is fitted with a reset LED (figure. 1.1, **4**), displaying the availability of device occur reset. The LED is connection to an I/O pin of the Neuron chip processor.

4.3 Connection Pin Assignment

The following tables show the connector pin assignment of the individual connectors. Connection the ***1*** marking cf. Figure. 1.1 On previously page.

In each clamp block pin 1 is situated on the left. For further wiring information see chapter 3.4.

LonWorks Network Connection

The double-core bus line can be connection either to LON A or to LON B. No polarity has to be considered by connecting the LonWorks network.

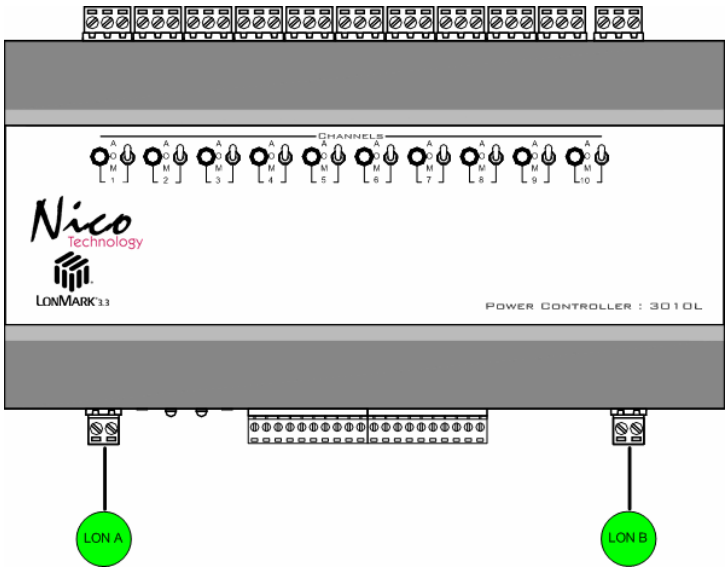


Figure 3.1 Connector pin assignment LonWorks network

Relay output circuit

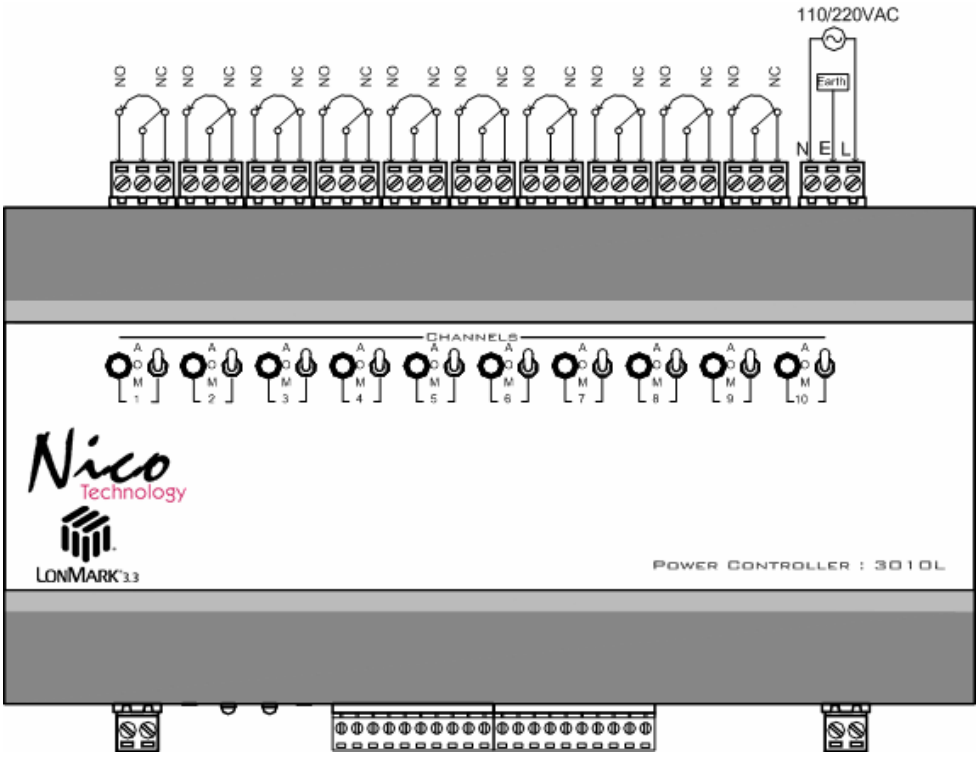


Figure 3.2 Connector pin assignment output circuit.

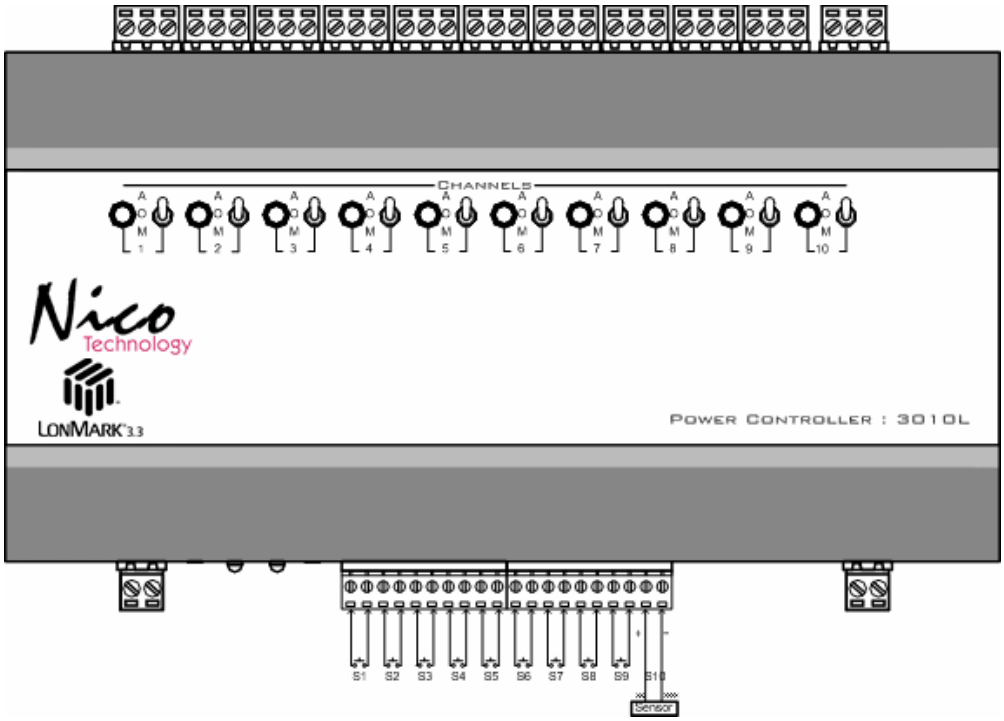


Figure 3.3 Connector pin assignment input circuit.

Power Supply

The 3010L has to be connected via connector 0 to 110/240V main voltage. Also see figure. 3.3.

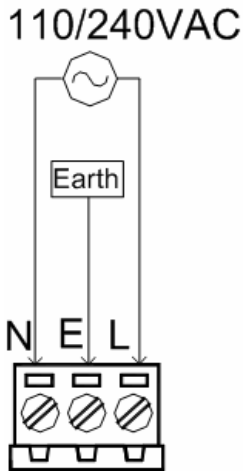


Figure 3.4 Connector pin for Power Supply

4.4 Wiring Diagram

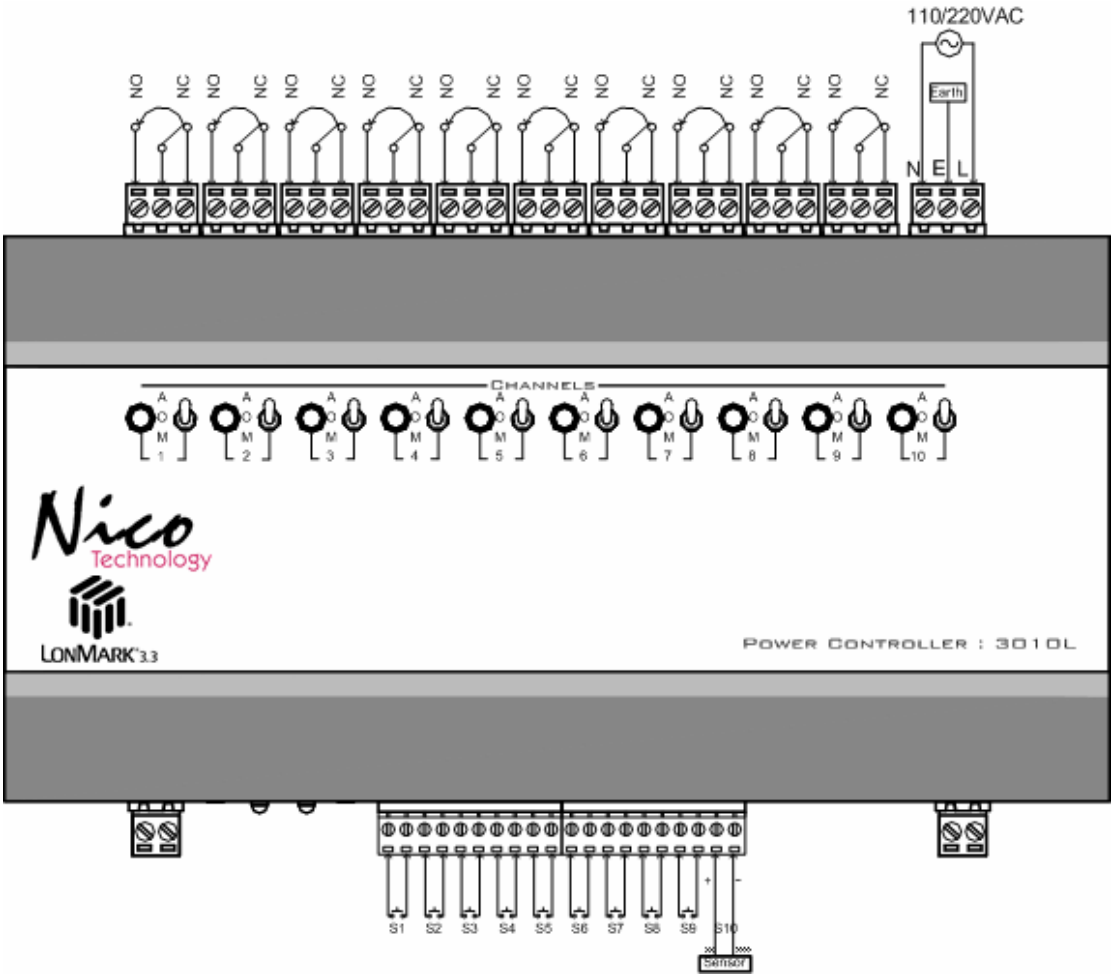


Figure 3.5 Connecting to 3010L

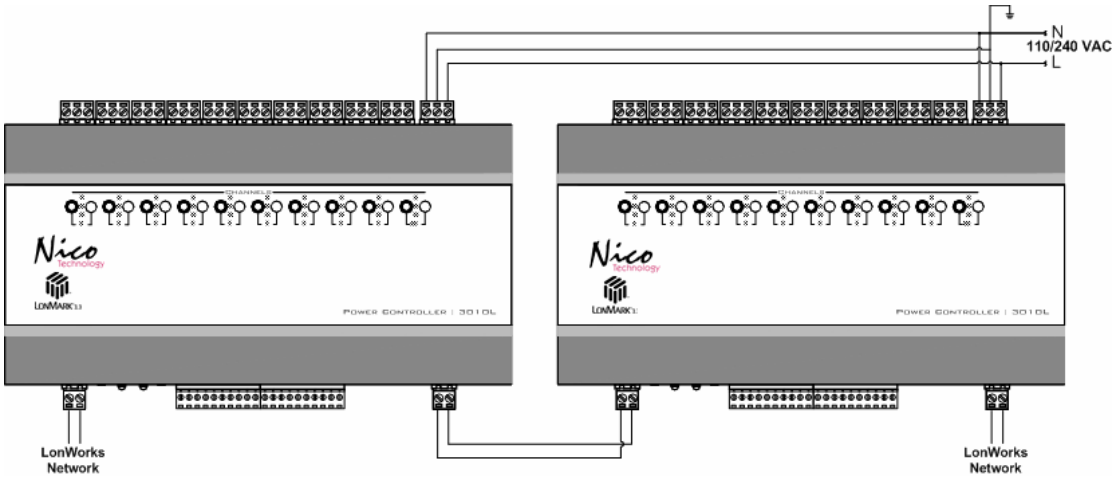


Figure 3.5 Connecting to two 3010L

4.5 EMC

The 3010L Power Controller is a CE certified device according to the regulation 89/336/EEC for electron magnetic compatibility, modified by 92/31/EEC". Concerning the emission it fulfills classification B (living area) according to EN 55022A/B, EN 55011 A/B and EN 50081-1/2 and, concerning the interference sensibility, classification A (industrial area) according to EN 50082-2.

4.6 Technical Specifications

CPU	Echelon Neuron 3150,10MHz	
Memory	48Kbytes flash EPROM,8Kbytes SRAM	
LonWorks Transceiver	FTT-10A/FT-X1/PL-3150	
Power supply	110/240VAC	
Power consumption	10~20mA	
Connection	Plug-screw clamp 0.2-2.5mm	
Protection class	IP 20	
Temperature	Operation	0 ~ +50
	Storage	-20 ~ +70
Admitted relative humidity	5 ~ 93%, non condensing	
Dimensions	235 x 120 x 55 mm, DIN 43880, incl. clamps	
Mounting	DIN rail(EN 50022, 35 x 15)	
Display & Operation	Service-pin and Reset LED indicator and button	
I/O Channels	10 relay output channels (max. 8Amp per channel) with 3 way by-pass switch and indicator. 10 dry contact input channels	

Table 3.1 Technical Specification

4.7 Dimensions

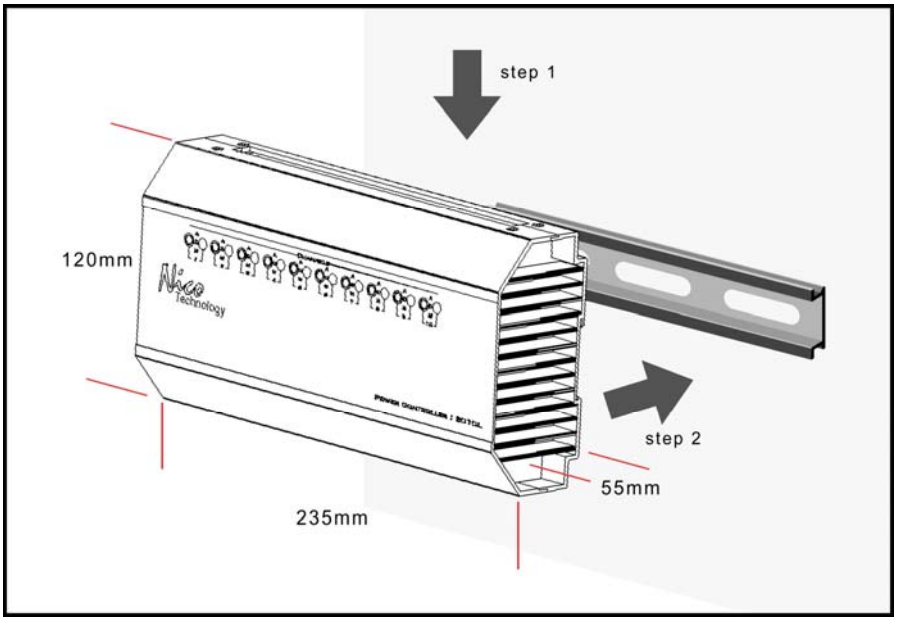


Figure 3.5 Device dimensions without plug-screw clamps

5 Application Software for Lighting Control

On the 3010L an application for switch control is implemented, making output functionality as well as switch control functions available.
Therefore the relevant LonMark profiles stated in Table 4.1 are implemented. The use of network variables (NV) compiles with the LonMark standard, no customized network variables are used. SCPT's are used for parameterization by applying the read/write-memory method.

Title	Present Version	Identification
LonMark Application Layer Interoperability Guidelines	V3.1	078-0120-01D
The SNVT Master List and Programmer's Guide	V 8.0	
The SCPT Master List	V 8.0	
LonMark Functional Profile Open Loop Sensor	V 1.0	001
LonMark Functional Profile Close Loop Actuator	V 1.0	004
Signal Input Switch Process Object		

Table 4.1 Referring document about LonMark profiles

5.1 System Scope

The 3010L is equipped with twenty channels, ten channels for Relay Output and other ten channels for Dry Contact input.
The relay outputs of the 3010L allow the connection of actuator. A Closed-Loop Actuator (CLA) object and Open-Loop Sensor (OLS) object according to LonMark Standard can be assigned to these output and configured.
Furthermore the 3010L can act as constant switch controller and sensor controller. The switch and sensor detect either generated by the internal CLA and OLS object; via an input network variable.

The 3010L is equipped with ten relay outputs circuit to connect e.g. Fluorescent Light, Motorize Screen.
Other ten dry contact input circuit to connect e.g. Motion Sensor, Smoke detect, Alarm speaker.

5.2 Interoperable Interface

The LonMark profile *004* is realized in the 3010L. As no customized NVs are used, the network interface remains standardized, clear and especially it is interoperable. That means, the 3010L can be used in connection with

network components by other manufactures. The following table contains a survey of the network variables defining the 3010L network interface and their assignment.

NV Name	Type	Allocated Object
nviSwitch	SNVT_switch	Closed-Loop Actuator
nvoSwitch	SNVT_switch	Closed-Loop Actuator and Open-Loop Sensor
nviSwInput	SNVT_switch	Nico Tech. Signal Input Switch Processor
nvoSwOutput	SNVT_switch	Nico Tech. Signal Input Switch Processor

Table 4.4 Allocation of NVs and LonMark objects

Under the order code 3010L a data carrier containing the interface describing file ***Nico_ Nico_PwrCtrl-3010L_r1.XIF*** and the application ***Nico_PwrCtrl-3010L_r1.APB*** is provided free of charge at simultaneous purchase of a 3010L. The XIF-file is necessary for integration with LonMaker for Windows or any other LonWorks network management tool.

6 System Objects

This chapter describes the LonMark objects implemented in the 3010L Power Controller. For each it states the network variable les used, special configuration properties, general object properties, response during modification of the configuration and after a reset, and, if available, further object properties.

Finally the relevant plug-in designated to configure the object is described. Details about handling of the plug-ins can be found in chapter 7.

6.1 Node Object

The functionality of the node object is defined in the Application Layer Guidelines of LonMark Interoperability Association (www.lonmark.org).

Network Variables

NV Name	NV Type	Comment
nviRequest	SNVT_obj_request	Status request
nvoStatus	SNVT_obj_status	Status response
nvoAlarm	SNVT_alarm	Alarm generating
nvoFileDirectory	SNVT_address	Address of file for parameterization

6.2 Closed-Loop Actuator (CLA) Object

Network Variables

NV Name	NV Type	Comment
nviSwitch	SNVT_switch	
nvoSwitch	SNVT_switch	
nviSwitch	SCPTinvrtOutput	Override behavior
nviSwitch	SCPTmaxRcvTime	Invert Output
nviSwitch	SCPTovrValue	Receive Heartbeat
nvoSwitchFb	SCPTmaxSendTime	Override Value
nvoSwitchFb	SCPTminSendTime	Send Heartbeat

Configuration Properties

CP Name	CP Type	CP Index	Comment
SCPTdefOutput	SNVT_switch	7	Default output
SCPTlocation	SCPT_location	17	Additional free comment
SCPTobjMajVer	SCPTobjMajVer	167	Read only; Must read from device
SCPTobjMinVer	SCPTobjMinVer	168	Read only; Must read from device
SCPTovrBehave	SCPTovrBehave	32	Override behavior

6.3 Open-Loop Sensor (OLS) Object

Network Variables

NV Name	NV Type	Comment
nvoSwitch	SNVT_switch	Sensor input status
nvoSwitch	SCPTdebounce	Debounceing Time
nvoSwitch	SCPTdefOutput	Default output
nvoSwitch	SCPTinvrtOutput	Invert Output
nvoSwitch	SCPTovrValue	Override Value
nvoSwitch	SCPTmaxSendTime	Receive Heartbeat
nvoSwitch	SCPTminSendTime	Send Heartbeat

Configuration Properties

CP Name	CP Type	CP Index	Comment
SCPTlocation	SCPT_location	17	Additional free comment
SCPTobjMajVer	SCPTobjMajVer	167	Read only; Must read from device

SCPTobjMinVer	SCPTobjMinVer	168	Read only; Must read from device
SCPTovrBehave	SCPTovrBehave	32	Override behavior

6.4 Nico Tech. Signal Input Switch Processor Object

Network Variables

NV Name	NV Type	Comment
nviSwInput	SNVT_switch	
nvoSwOutput	SNVT_switch	
nvoSwOutput	SCPTdebounce	
nvoSwOutput	SCPTinvrtOut	
nvoSwOutput	SCPTmaxRcvTime	
nvoSwOutput	SCPTdefOutput	
nvoSwOutput	SCPTmaxSendTime	
nvoSwOutput	SCPTminSendTime	
nvoSwOutput	SCPTovrValue	
nvoSwOutput	UCPTactiveSw	
nvoSwOutput	UCPTinactiveSw	

Configuration Properties

CP Name	CP Type	CP Index	Comment
SCPTlocation	SCPTlocation	17	Location
SCPTobjMajVer	SCPTobjMajVer	167	Read only; Must read from device
SCPTobjMinVer	SCPTobjMinVer	168	Read only; Must read from device
SCPTOffDely	SCPToffDely	30	OffDelayTime
SCPTovrBehave	SCPTovrBehave	32	OverrideBehave
UCPTdigitallOProcessType	UCPTdigitallOProcessType	4	[Digital Input]: Affects the translation of incoming data to the value passed to the output network variable. [Digital Output]:

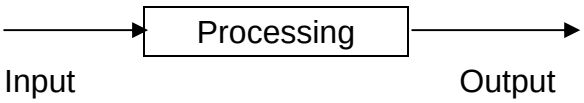
			Determines how the denounced input data is translated into the value used to drive the actuator.
UCPTonDelay	UCPTonDelay	2	On Delay Time
UCPTpulseWidth	UCPTpulseWidth	12	Pulse Width

Explain UCPTdigitalOProcessType

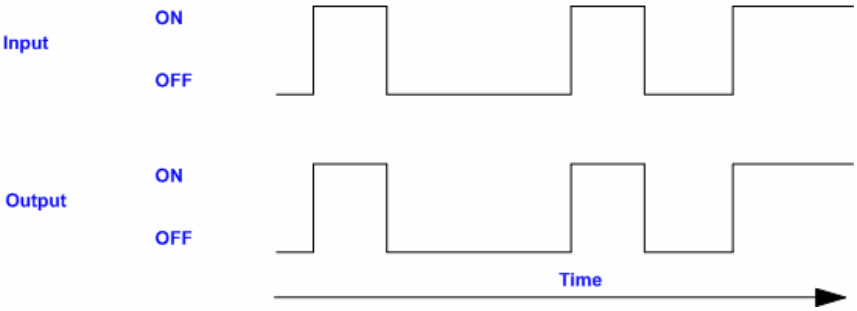
UCPTdigitalOProcessType:

Affects the translation of incoming data to the value passed to the output network variable.

There are five processing options: Direct, Delay, Toggle, Pulse, and One-Sot

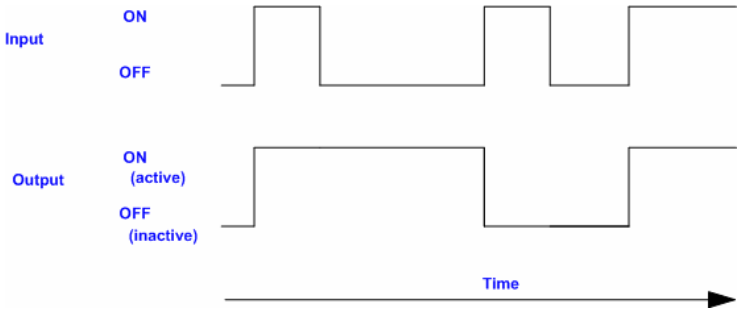


Direct



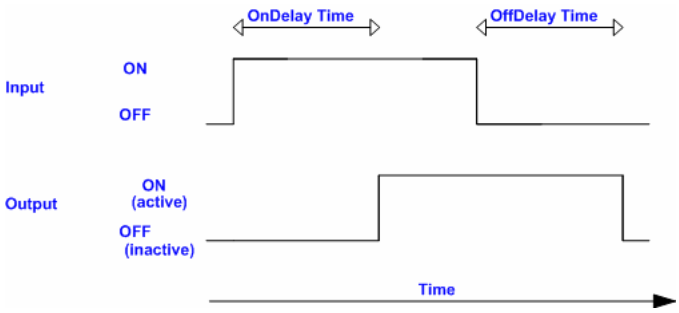
The Direct option causes data to be output directly after the debounce and invert functions have executed.

Toggle



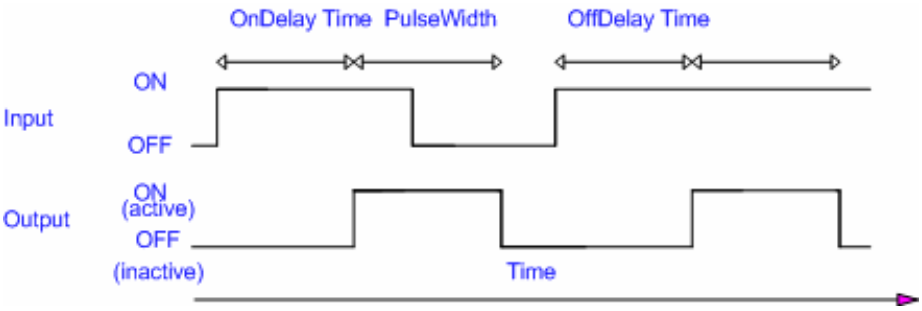
The Toggled option causes the output data to toggle, or change state, every time the input data changes from OFF to ON.

Delay



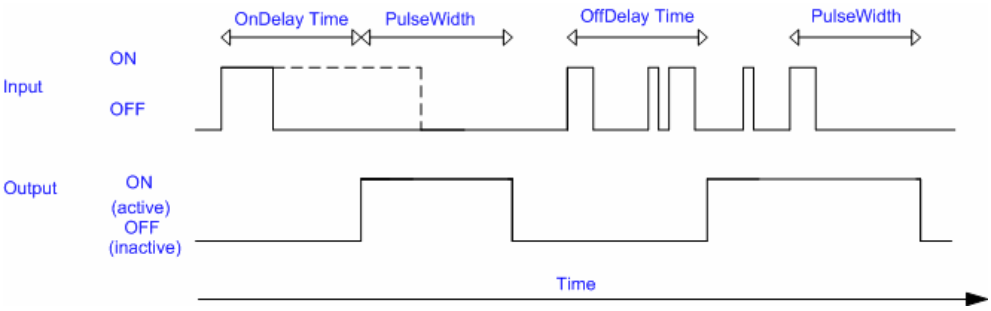
The Delay option specifies a delay from a change on the input to an update on the output network variable. A change from OFF to ON is delayed by the time specify by configuration property Turn-On Delay. A change from ON to OFF is delayed by the time specify by configuration property Turn-Off Delay.

Pulse



The Pulse option generates a pulse on the output network variable every time the input data changes from Off to On. The pulse is generated after a delay specified on the Turn-On Delay. The duration of the pulse is specified on the Pulse width field. It does not matter how long the input data remains on, the output will always send a pulse of the specified length after waiting the configured delay.

One shot



The One Shot option generates a pulse on the output network variable every time the input data changes from OFF to ON state. The pulse is generated after a delay specified on the Turn-On Delay. The duration of the pulse is specified in the pulse width. If the input data changes from Off to On while the pulse is being sent, the pulse timer will be reset (i.e., if a two second pulse was re-triggered after one second, the output would be on for two more seconds, or three seconds total). If a delayed pulse is re-triggered during a pulse, the delay will be ignored. If a pulse is re-triggered during a delay, thee trigger will be ignored.